

SYMPHYOTRICHUM PYGMAEUM: TRANSFER  
OF *EURYBIA PYGMAEA* FROM THE EURYBIOID GRADE  
TO THE SUBTRIBE SYMPHYOTRICHINAE  
(ASTERACEAE: ASTEREA)

Luc Brouillet and Sugirthini Selliah

*Herbier Marie-Victorin  
Institut de recherche en biologie végétale  
Université de Montréal  
4101 sherbrooke St. E  
Montreal, Quebec, CANADA, H1X 2B2  
email: luc.brouillet@umontreal.ca*

ABSTRACT

Morphology and molecular phylogenetic data show that *Eurybia pygmaea* is not a member of *Eurybia* but belongs in *Symphytotrichum*, close to *S. yukonense* of subg. *Virgulus* section *Grandiflori*. Therefore, we transfer the species to that genus, as *Symphytotrichum pygmaeum* (Lindl.) Brouillet & S. Selliah.

RESUMEN

Los datos filogenéticos morfológicos y moleculares muestran que *Eurybia pygmaea* no es un miembro de *Eurybia* sino que pertenece a *Symphytotrichum*, próximo a *S. yukonense* del subg. *Virgulus* section *Grandiflori*. Por ello, transferimos la especie a ese género como *Symphytotrichum pygmaeum* (Lindl.) Brouillet & S. Selliah.

*Eurybia pygmaea* (Lindl.) G.L. Nesom, the pygmy aster, is endemic to the western Canadian Arctic and northeastern arctic Alaska. Described initially as *Aster pygmaeus* Lindley, it was later placed in synonymy of the morphologically similar *Eurybia sibirica* (L.) G.L. Nesom (*A. sibiricus* L. subsp. *pygmaeus* (Lindl.) Löve & Löve or *A. sibiricus* var. *pygmaeus* (Lindl.) Cody). *Eurybia sibirica* is a primarily western, boreal montane species that reaches the western North American Arctic and crosses into Eurasia, the only species of genus *Eurybia* to do so. This species clearly belongs to the eurybioid grade (Brouillet et al. 2004).

In his work on the North American species of asters, Nesom (1994) accepted the hypothesis of a close relationship between *A. pygmaeus* and *A. sibiricus*, and therefore transferred the former to *Eurybia* at the rank of species, *E. pygmaea* (Lindl.) G.L. Nesom. Hultén (1968) and Porsild and Cody (1980), however, had drawn attention to the similarity of *E. pygmaea* (as *A. pygmaeus*) to another species, *Aster yukonense* Cronquist, an endemic of interior Yukon and Alaska, and of the Mackenzie drainage of the Northwest Territories. Nesom (1994) transferred *A. yukonense* to another North American segregate of *Aster*, *Symphytotrichum*, as *S. yukonense* (Cronquist) G.L. Nesom, as a member of subgenus *Virgulus*. He did

not discuss the possible relationships of *E. pygmaea* to *S. yukonense*. Scoggan (1978–1979) underlined the similarity of *S. yukonense* to *S. campestre*. Subgenus *Virgulus* is characterized by its chromosome base number of  $x = 5$ , while *Eurybia* has  $x = 9$ . The chromosome number of *E. pygmaea* is yet unknown.

In a molecular-based (nr DNA ITS and ETS) phylogenetic analysis of the eurybioid grade with respect to other North American Astereae (subsequent to Brouillet et al. 2004), *Eurybia pygmaea* did not group with other species of the genus, but was found embedded within the Symphyotrichinae with members of *Symphyotrichum* subg. *Virgulus*, in a clade comprising *S. novae-angliae* (ITS dataset, which did not include *S. yukonense*) or *S. novae-angliae*, *S. fendleri* and *S. yukonense* (ETS dataset) (S. Selliah and L. Brouillet, unpublished). In the latter, *E. pygmaea* is sister to *S. yukonense*. Forcing *E. pygmaea* to *Eurybia* results in much longer trees and is therefore less parsimonious. Furthermore, genus *Eurybia* is characterized by a synapomorphic deletion of 9 bp in the *trnL* intron (cpDNA), a deletion not found in the closely related *Oreostemma*, *Herrickia*, *Triniteurybia* or Machaerantherinae, nor in any other North American Astereae investigated so far, including members of the Symphyotrichinae (M. Lauzé, pers. comm.). These data indicate that *E. pygmaea* is not a member of *Eurybia*, but instead belongs to *Symphyotrichum* subgenus *Virgulus*, section *Grandiflori*. This hypothesis would be easily tested by counting the chromosome number of *E. pygmaea*: a count based on  $x = 5$  (with a distinctive karyotype, Semple & Brouillet 1980) would confirm membership in the *Virgulus* group of *Symphyotrichum*.

Morphologic examination of herbarium specimens reveals the striking similarity of *Eurybia pygmaea* to *Symphyotrichum yukonense*, to the point that a problem of a transition between the two species may be perceived (D. Murray, pers. comm.). Indeed, smaller, single-headed individuals of *S. yukonense* could be easily mistaken for the former. Both species have wiry caudices, stems short, branched, purplish, simple, brittle, villous, leaves yellowish-green, narrow, more or less clasping, entire (occasionally subserrate in *E. pygmaea*), sparsely villous or strigose to glabrate, marginally ciliate or villous-ciliate, capitulescences few-headed and paniculiform or single-headed, and campanulate heads with phyllaries subequal, often purplish, not or little basally scarious, leafy, lanceolate to linear-lanceolate, more or less villous, rays 8 to 30, purple, 5–11 mm long, disc corollas weakly ampliate or funnellform, nerved cypselae with sordid or purplish, acute, barbellate bristles. Observation of the phyllary tips of *E. pygmaea* further revealed the presence of a few short-glandular hairs, which are absent from *E. sibirica* but typical of the *Grandiflori* and of *S. yukonense*. This needs to be confirmed by examination of live material to ensure that the small hairs observed are indeed glandular and similar to those of *S. yukonense*. Overall, similarities between *E. pygmaea* and *S. yukonense* are greater than those perceived between the former and *E. sibirica*.

Within the framework of preparing treatments for *Eurybia* and *Symphyotrichum* for the Flora of North America project, we are therefore proposing the transfer of *Eurybia pygmaea* to *Symphyotrichum*.

***Symphyotrichum pygmaeum*** (Lindl.) Brouillet & S. Selliah, comb. nov. **BASEONYM:** *Aster pygmaeus* Lindley in W.J. Hooker, Fl. Bor.-Amer. 2:6. 1834. *Aster sibiricus* L. subsp. *pygmaeus* (Lindley) Löve & L. Löve, Bot. Not. 128:521. 1975 (1976). *Aster sibiricus* L. var. *pygmaeus* (Lindley) W. J. Cody, Canad. Field-Naturalist 68: 117. 1954. *Eurybia pygmaea* (Lindl.) G.L. Nesom, Phytologia 77:261. 1994 (1995).

#### ACKNOWLEDGMENTS

The authors wish to thank D. Murray (University of Alaska Fairbanks) for information concerning this problem and for constructive comments on the manuscript, Guy Nesom (Botanical Research Institute of Texas) for comments on the manuscript, the curators of ALA and MT for the loan of specimens, and M. Lauzé (Université de Montréal) for the chloroplast DNA data.

#### REFERENCES

- BROUILLET, L., L. URBATSCH, and R.P. ROBERTS. 2004. *Tonestus kingii* and *T. aberrans* are related to *Eurybia* and the *Machaerantherinae* (Asteraceae: Astereae) based on nrDNA (ITS and ETS) data: reinstatement of *Herrickia* and a new genus, *Triniteurybia*. *Sida* 21:889–900.
- HULTÉN, E. 1968. Flora of Alaska and neighboring territories. Stanford Univ. Press, Stanford, CA.
- NESOM, G.L. 1994. Review of the taxonomy of *Aster sensu lato* (Asteraceae: Astereae), emphasizing the New World species. *Phytologia* 77:141–297.
- PORSILD, A.E. and W.J. CODY. 1980. Vascular plants of Continental Northwest Territories, Canada. Nat'l Mus. Canada, Ottawa.
- SCOGGAN, H.J. 1979. The flora of Canada. Part 4 - dicotyledonae (Loasaceae to Compositae). Nat'l Mus. Nat. Sci. Publ. Bot. 7(4).
- SEMPLE, J.C. and L. BROUILLET. 1980b. Chromosome numbers and satellite chromosome morphology in *Aster* and *Lasallea*. *Amer. J. Bot.* 67:1027–1039.